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EL PACAYAL: A COFFEE FINCA IN GUATEMALA[1]

SAM T. BRATTON
University of Missouri

El Pacayal is one of some 2,000 Fincas engaged in the commercial production of coffee in the Republic of Guatemala. These Fincas are located in three general areas. The largest and most important is on the Pacific slope of the southern mountain range. This area produces about eighty-four per cent of the total annual crop of about 130,000,000 pounds. The second area in importance, commonly known as "Coban," is located on the slopes of the northern range, and produces about 10 per cent of the annual crop. The third area is in the Central Highlands, centering around the ancient capital, Antigua, and produces about 6 per cent.

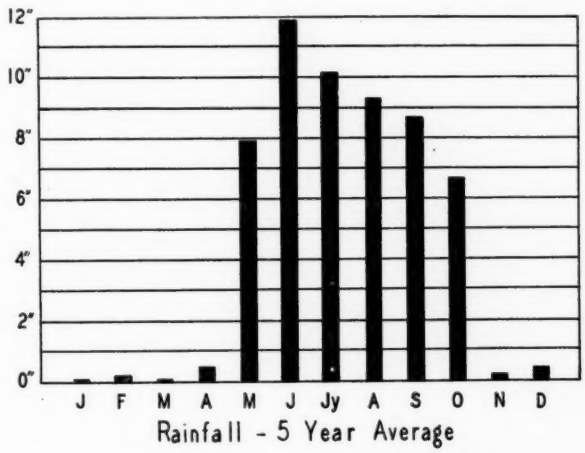

Fig. 1. Rainfall, five year average. Data from records at Finca. Standard U. S. Weather Bureau instruments.

In each of these areas physical conditions favorable for the production of coffee markedly are similar. The growing season is continuous with mild temperatures at all times. Common daily and monthly temperatures range from 62° to about 72°F. Rainfall is abundant, but seasonal. The wet season is from May to October, inclusive, and the dry season is from November to April (Fig. 1).

[1] Based on Field Work, summer 1937.

Finca activities largely are in response to seasonal distribution of rainfall. Soils are volcanic in origin and vary in color and fertility in conformity with original source materials, length of time of use, and methods of fertilization practiced.

Finca El Pacayal is typical of the Fincas in the larger area. The original Finca comprises some 2,899 acres, and with additions has a total area of 5,600 areas. The core of the Finca is located on a flattish area of some sixteen acres at an elevation of 4,200 feet. The core

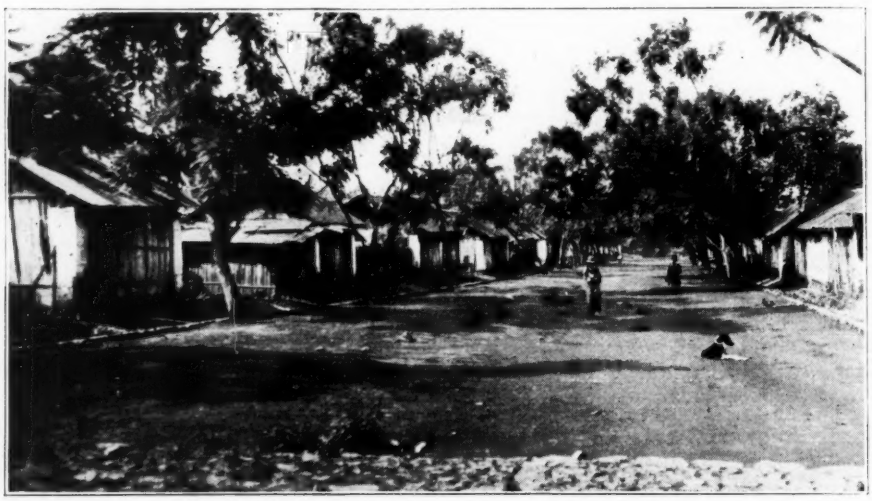

Fig. 2. Indian village at El Pacayal. Part of paving of main connecting thorofare in foreground.

consists of the homes of the owner and other administrative officers, the business offices, cleaning and drying plant, and the native (Indian) village. Main thorofares, paved with flagstones and guttered to provide drainage, connect various parts of the core area.

Surrounding the core are the coffee fields, varying in size from a few acres to one hundred or more. These fields are on slopes, ridges, and flats, among which are relief differences of more than one thousand feet. These non-contiguous and irregularly distributed fields seemingly are detached from the core area, but a close inspection reveals a system of trails, pack roads, and cart roads which connect the widely separated parts of the Finca with the central area.

The Finca is a commercial enterprise. Its organization and management are designed for the efficient production and marketing of coffee. General supervision is under the direction of the

owner and his son. Other administrative officials are auditor, manager, engineer, and field foremen.

Workers, native Indians, number approximately 250. Most of these workers have families and live in the core village (Fig. 2). These families are furnished houses, garden plots, corn land, and fuel for heating and cooking. The village community is furnished a school building, a church building, and a laundry.

In addition to these permanent aids each worker with family is given twenty five pounds of corn each Monday morning. The unmarried workers are given daily squared cakes made of steamed corn, equivalent to two pounds of corn.

A commissary is maintained at which the workers may purchase a variety of common articles, such as cotton goods, clothing, shoes, other leather goods, candy, tobacco, rope, baskets, toys, chewing gum, and soft drinks. Prices for such articles conform to common American prices. Also, the people may sell to the commissary some products, as poultry, eggs, and handcraft articles.

The day's work begins early each work-day morning. At four o'clock the Finca bell rings, at first a slow beat, weird and uncomfortable; then gradually the tempo increases until a veritable clamor is pounding thruout the Finca, impelling and demanding. At six o'clock work begins. Lunch is from ten thirty to eleven, then work again until the day's task is done. When the task is completed the worker quits for the day, unless delinquent on previous tasks. Pay is according to task—not by the day.

A task is not a full day's work as we, in the United States, understand the term—day's work. Tasks are set according to the abilities of the average workers, men, women, and children. After the task is done the workers may use the remainder of the day as they please. Common activities are garden and corn-land work, gathering fuel wood, visiting, or resting.

GROWING THE COFFEE CROP

During the first year the plants are developed in a nursery under dense shade. They are then re-set in another, but less densely shaded nursery where they remain the second year.

Field planting is done in the early part of the rainy season, about July, or August. Nursery plants some three or four feet in height are taken up with about twelve inches of soil thoroly wet, compacted, and wrapped about the roots and set out as replacements, or in new plantings. In the new plantings shade already has

been provided, bananas for temporary and controlled shade, and Inga trees for permanent shade. Both replantings and new plantings are set along contours, the new plantings twelve to fifteen feet apart in rows approximately the same distance apart. Plantings commonly average about 300 trees per acre.

In February the new plants are bent over and the tops fastened securely with a hooked stick. New growth now takes place at the bend where several shoots come out. Later these shoots are pruned to three or four and the old top is cut off. The shoots form the tree

Fig. 3. De-shaded coffee. Banana plants are thinned out, and Inga trees pruned. The debris is arranged along contours.

which begins bearing at six or seven years and continues to bear indefinitely. Some trees on El Pacayal have been bearing for more than fifty years. A pound of marketable coffee per year per tree is a fair average.

Cultivation for both new and old plantings consists of pruning, cleaning, de-shading, contour building, and fertilization. Cleaning is done with machete and hoe. As the weeds and vines are cut and chopped the rubbish is arranged along the contour lines. This serves as a mulch and as protection against excessive erosion. Additional fertilization is "Humber," a fish scrap from England.

Pruning and de-shading are done at the beginning of the rainy season. While the trees are in fruit the heavily loaded limbs bend downward. At these bends new shoots come out, a repetition of the tendency of the small tree to produce shoots when bent and fastened

at the time of planting. Pruning removes undesirable shoots, also limbs which appear not advantageous. Such pruning is a part of the de-shading process. Other de-shading is done by trimming some banana plants, removing others, and by pruning the permanent shade trees (Fig. 3).

HARVESTING AND MARKETING

One crop is produced each year. The berries are ready for harvest when they have attained a scarlet color and are about the size

Fig. 4. Part of the drying floors. The main flotation canal from the building to the floors is on the left (not shown). Smaller canals lead from the main canal to various parts of the floors. The center covered trough contains the endless bucket-belt by which the coffee is brought from the floors to the artificial driers in the main building. In the background are the cart-loading sheds.

of a cranberry. Two grains, flat sides turned inward, are in each berry.

Picking is done during the dry season, and requires several weeks. Normally each tree requires two or three pickings, as all berries do not reach maturity at the same time. The berries are picked singly, not pulled, or stripped. Such pulling is likely to take the pulp only, leaving the grains attached to the limbs.

Each worker brings his basket of berries to the receiving hoppers which are marked to measure the amount. If the basket fills the hopper to the task mark (100 pounds) the worker may quit for the day, and usually does. From the receiving hoppers the berries are floated into tanks, and by flotation a preliminary grading is

done. The berries are then floated into the crushers where the pulp is loosened, then into the rotating cleaning cylinders where most of the pulp is removed.

After cleaning the grains are run into fermentation tanks, remaining from 36 to 40 hours, until, by hand test, the gummy substance on the grains easily slips off. Fermentation requires expert knowledge as just the right amount is necessary to produce a desirable flavor. From the fermentation tanks the grains are floated into the centrifugal washing machines which remove the gummy substance, but not the hulls.

Drying is the next process. The grains are floated thru canals and during the run constantly are stirred and further graded. As the grains pass along they are diverted into smaller and smaller canals, according to various grades, and finally to different sections on the drying floor (Fig. 4). On the drying floor the grains are raked and turned in the sun for one day, then conveyed on an endless bucket-belt to the artificial driers. Hot air is blown into the rotating driers for about thirty-six hours. The dry, but unhulled grains, are now put into bags and stored until sold. Hulls are left on the grains because hulled grains quickly absorb moisture, thus damaging the physical grain, also its quality.

When sold, the bags are taken from storage and the grains hulled and cleaned by blowers. Additional grading is done in rotating perforated cylinders which grade by size and shape. The final grading is done by hand. The coffee is poured onto large tables and women and children hand-pick carefully, taking out all grains that do not conform to requirements in color, size, and shape. The selected coffee is then put into bags of 150 pounds each, marked with the trade name "El Pacayal" and run out to the cart sheds.

Ox carts, loaded with ten sacks per cart, take the coffee down the slope to Pochuta, a distance of six miles. At Pochuta the coffee is taken by motor truck to the railway at Patulul, some twenty miles. From Patulul most of the coffee leaves the country by way of Guatemala City and Puerto Barrios, on the Caribbean.

TYPE STUDY OF A CITY FOR GRADE FIVE BOSTON, MASSACHUSETTS

MARION O. LITTLE
Boston, Massachusetts

Let us approach Boston in a very modern way, by air. Whether we fly from north, south, or west, we shall find excellent service as the airport is one of the finest in the country. As the plane crosses the hinterland, which is New England, one gains an idea of the background of the city and some of its possibilities as the commercial center of New England. The ascending smoke, which at times envelops the area over which we fly and at times obscures the view, marks the site of factories. Too numerous by far to count, our fellow passengers tell us of cotton and woolen mills, worsted mills, shoe and leather factories, tanneries, machinery on a large scale, such as textile machinery, and the more delicate metal work of silverware and jewelry. Swift flowing rivers give possibility of "white coal" and the presence of logs in other streams show lumbering is not altogether a lost industry.

BOSTON FROM THE AIR

Our plane has now reached the immediate hinterland and we see that the city lies in a true basin; low, level land surrounded by rounded hills. These are drumlins, left by the glacier and give Boston a topography all its own. Our pilot is kind enough to circle the city and pass over the harbor. We are impressed by its size, its natural protection formed by many low, sandy islands, also the gift of the glacier. Huge steamers and myriads of smaller ones show how extensive is the commerce. One final skyview and we land safely at the East Boston Airport on our American Airliner. A kindly citizen greets us and offers to be our pilot on land as we visit the capital of Massachusetts and the largest city in New England.

HISTORICAL BACKGROUND

We take a taxicab to our hotel in the center of the city and our guide tells us a little of Boston's history as a background to understand the present city. It was settled in 1630 by a group of Puritans led by one John Winthrop, who thereby became the first Governor of the Colony. Entering the harbor with a fleet of eleven ships he was impressed by the possibilities of a settlement on the peninsula, as it was protected by three rather conspicuous hills. The settlers

landed and named the town in honor of the King "Charlestown." Sickness soon threatened to close the venture. Across the river mouth on a neighboring peninsula lived an English clergyman, William Blaxton or Blackstone, as it is usually spelled. He explained that poor water was the cause of the trouble and suggested to Winthrop that he move over. He explained that the place was called "Shawmut" by the Indians but he termed it "Tri-mountain. The colonists agreed and found clear springs of water which provided the young city with its water for many a long year. One of them is commemorated today in a tiny street called "Spring Lane." The town soon became "Boston" as a tribute to Boston, England. The sturdy Puritans spread out from the peninsula forming small settlements some of which are part of Municipal Boston and others are included in the Metropolitan Area but under local self-government. The sturdy type of pioneer was joined by others until Boston grew to be the nucleus of a large Puritan settlement. Their love of liberty and justice caused it to play a conspicuous part in the Revolution. Religion and education played an important part in its early development and still continue to do so. Its educational system is of high rank and students come from the four corners of the earth to study in the Metropolitan Area at the world famous Harvard University, Massachusetts Institute of Technology, Radcliffe, Boston University, and Boston College as well as at special schools of art, music and science. The sturdy pioneers not only played their part in the Revolution but in the formation and subsequent history of the nation. Its historic spots are one of its claims as a tourist resort.

Topography

During this rough historical sketch our taxi has threaded its way thru narrow streets and congested traffic and we wonder how we shall ever find our way alone. Our hotel is delightfully situated so that we have a wide sweep over a large part of the city. An excellent roof-garden helps us to see the general plan of it. Topographically, it is very flat in the heart of the city and we notice that we are really on the floor of the Basin. To the south rise the Blue Hills and to the north the heights of Arlington. Westward are low hills which continue out of our sight. The area in which we are staying is called "Back Bay"; so named because the Charles River at flood tide formed a sort of "back bay" to the peninsula in contrast to the open harbor in front of the town. The flats of the river bed were eradi-

cated by filling them from the two hills and lowering the third. The resulting land is still called "Back Bay."

TRANSPORTATION FACILITIES

Next day we visit the city proper to learn something of its business and its geographic importance. Remembering the factories of the hinterland and the excellent harbor we go first to the large railroad stations. There are two, the North Station and the South. The former is the headquarters of the Boston and Maine Railroad which serves northern New England and the west, by connections at Troy, New York, and thru northern New England with the Canadian lines. The South Station provides connections with the west via Albany and direct connection with New York City and points south. This station is the home of two railroads, the Boston and Albany, a lessee of the New York Central, and the New Haven Railroad. Thru these three gateways pass millions of dollars worth of freight eastward as exports of New England and the West, as well as imports of raw material. We now pass to the waterfront which may best be viewed from the Custom House Tower; and let us not forget Boston was a Customs port prior to the Revolution. The old building still stands but has been modernized and enlarged with a high rectangular tower which is conspicuous on the skyline. Local coastwise shipping has been somewhat curtailed or rather superseded by trucking on the excellent highways. The best of these lead west via Worcester; south thru Providence and north via Portland. Direct transportation by water is provided to New York by the Eastern Steamship Company; to Philadelphia, Baltimore, Norfolk and Newport News by the Merchants' and Miners' Line; Savannah, by the line of the same name, and to the Canadian Maritime Provinces. Foreign lines include the Cunard-White Star and Anchor lines to Great Britain and Boston is a port of call on Holland, Italian and Polish lines. The harbor is an excellent one with a deep natural channel. There are some forty miles of dockage of which eight miles have a depth of from thirty to forty feet at mean low water. When dredging operations, now in progress, are completed any vessel afloat may be accommodated at the piers. It has one of the largest dry docks in the world, being surpassed only by Liverpool and Southampton. It is the largest one on the Atlantic seaboard. Its advantages over other American cities in European trade are many. It lies two hundred miles nearer Europe than New York City, thus saving at least one

day; it is twelve hundred miles nearer Panama than San Francisco and one hundred twenty miles nearer Rio de Janeiro and Buenos Aires than is Baltimore. One saves from one hundred fifty to five hundred miles between Boston and the ports of the United Kingdom, Europe and the Near East.

COMMERCIAL IMPORTANCE

It has been a busy day and we return to our hotel to rest and read some of the literature we have acquired. Bearing in mind the excellent means of transportation that we have seen and the industrious hinterland, we are not surprised at the volume and variety of trade in this interesting city. We find it is the center of the paper trade in the United States. It is the largest wool market in the world, receiving more than one-third of the raw wool entering the country, and it has the largest wool warehouse in the world. This is located not far from the South Station and near very up-to-date piers. Around Boston centers the cotton manufacturing district as well as a rich and varied industrial area. It is the leading American center for high grade coffee and one of the three leading rubber manufacturing regions of the country. America's sweet tooth is well supplied by Boston which is the center of the candy industry as well as a leading sugar refining center. It is the largest fresh fish market in the western world and it has the largest fish storage plant in the entire world. It ranks second in the volume of imports and one of the leaders in the export trade of the United States.

AIR FACILITIES

Added to its transportation by land and sea is its excellent air service. The "flats" along the edge of "Noddle Island," as East Boston is locally known, provided a natural airbase. Long before it became a commercial airport there was great interest in aviation altho the field was on the southerly side of the harbor. Twenty-five years ago the Squantum Field was the scene of weekly trial flights, most noteworthy being the famous one to Boston Light and return. The present airport impressed Colonel Lindbergh when he visited it after his New York to Paris flight. The American Airways service between Boston and New York provides frequent service. Connection is made there with the other transcontinental lines. Mail and express as well as passengers are being carried in ever increas-

ing amounts. While somewhat isolated from Boston proper the airport is only a short taxi ride from a rapid transit station direct to the heart of the city or directly via a new vehicular tunnel without recourse to the electric railway, as we recalled from our first day's activity in the city.

THE CLIMATE

The climate of Boston has had a striking effect upon its development. Due to its location on the eastern edge of a continental mass in the temperate zone it has cold winters and hot summers. At approximately forty-two and a half degrees north latitude the winters are not too severe and they are tempered by proximity to the salt air. This however brings a raw chill so that winter rather overlaps into spring and the citizen from inland cities cannot tolerate the spring. This chill is especially noticeable in March and April and even into May when one might expect gentle spring. The snowfall is very variable. Sometimes a heavy fall before Christmas will lie on the ground all winter due to continuous low temperatures. Other winters are less severe, with rain or sleet rather than snow. In the summer, heavy rain and thunder showers provide an excellent amount of moisture for which market gardeners in the Greater Boston area are truly grateful. The city is peculiarly free of severe thunder storms, seldom having any which cause heavy damage. The cities and towns about it however, frequently have them. One characteristic of the city without which no true picture of Boston is complete is its famous "East Wind." Not such a treat during November or March it is a veritable life-saver in July and August. A warm, sultry spell from the southwest spreads over the area. Temperatures rise to ninety plus and the humidity soars. The unwary leave wraps at home. The true Bostonian eyes the weather vane. Soon a whiff of sea air is noted. Bit by bit it increases until a real breeze is blowing. A real refreshing sea air is noticeable. Down go windows and one reaches for a coat. The mercury also tumbles and life is bright again. It is not unusual for a change of twenty to thirty degrees in an hour. A hot spell of three or four days is usually tempered by an "easterly spell" as the local inhabitant says. Of course there are exceptional summers but usually the season is not a hardship for tourists. Another summer joy is the nearness to salt water. Two fine, sandy beaches under state control lie within an hour's trip, and there are many local ones under municipal sway. This ease of salt water bathing is a great boon to the people in all walks of life.

Character of the People

In our travels about Boston, to glean this information, we have been impressed by the types of people. Geography alone does not create great cities, much is dependent upon the character of the people. The citizenry today is to a large extent the immediate descendants of foreign-born stock. The original English stock is rapidly disappearing, at least as a power in the affairs of the city. The present Bostonian however reflects the background into which he has come. They are cordial to strangers without undue familiarity; they are reserved but not lacking in hospitality; education is still a driving force but the fine arts of music, drama, and art play a large part in the social life of the people. The Boston Symphony Orchestra ranks among the finest in the world. The spirit and vigor of the people is displayed in their ability to continually develop and beautify the city so that it may grow commercially and artistically.

Tourist Attractions

Since the entertaining of tourists is a recognized industry we feel that as tourists we should make a short study of Boston's importance as the gateway to New England's playground and learn something of its historic shrines. Whether one enters the city by land, sea or air from any point of the compass the "Golden Dome" is as true a landmark as "La Tour Eiffel" or "Saint Peter's" to their respective cities. The Dome symbolizes for Boston its position as the capital of Massachusetts. The building which supports the Dome, known as the State House, is located on the top of one of the three original hills. The central section is an excellent example of early American architecture. It is of red brick and was designed by Charles Bulfinch. It is flanked by white marble wings. The beautifully terraced lawn leads up to the façade. Within, one is impressed with its colonial architecture and a never-to-be-forgotten room is the sacred "Hall of Flags." Here encased forever are the battle flags carried in all the conflicts in which Massachusetts's men gave their all. The building is one of the high spots to visit and is a great mecca for all tourists. Directly opposite, and stretching down Beacon Hill to the shopping district is historic Boston Common. It was set apart first as a training field after its purchase from Blackstone. It later became the common pasture land for cows. The things which impress a visitor are the beautiful elm-shaded "Malls" or walks and the "Frog Pond." Adjoining the Common, separated only by a busy thorofare is the Public Garden; one huge garden

with many flower beds of surpassing beauty, changing with the seasons. Here is another pond upon which float that most famous of all Boston institutions, the Swan Boats. No one is too old or too young to ride upon them. Over the pond is built the smallest but most perfect suspension bridge in the world. It leads directly to the equestrian statue of George Washington; the work of the sculptor, Thomas Ball. The Garden rests upon "made land," made possible by filling the flats along the river. At one corner, prior to the filling, the British embarked in their boats on the first lap of their march to historic Concord and Lexington. This reminds our guide of another historic shrine. An interesting walk, under guidance, takes us past many famous spots to Paul Revere's House and the Old North Church. As we retrace our steps and leave the Common, we pass Park Street Church where "America" was first sung in public —adjoining the Church is the Granary Burying Ground where rest the bodies of the parents of Benjamin Franklin and many Revolutionary heroes—past King's Chapel, the first place of Anglican worship in the Puritan town—by the Old State House and so to Faneuil Hall. The latter called "The Cradle of Liberty" and the region about it is the center of the market district. Our new geographic knowledge of Boston helps us to realize its importance as a port of entry and the value of the market gardens. A few moments more brings us to the door of Christ Church or "The Old North." A small fee permits us to climb the ancient belfry and in our mind's eye we try to see the Boston of the Revolution. Below us lies Copp's Hill with its cemetery and its Battery; beyond lies the mouth of the Charles River and still farther off rises a granite shaft; a memorial to an American defeat and not a victory; that is Bunker Hill. To build this the first railroad in the United States was opened so that the blocks of granite hewn in the Quincy quarries might be carried to the Neponset River and then by boat to Charlestown. As our gaze follows the shore we see the Charlestown Navy Yard wherein is stationed the famous frigate "Constitution" better known as "Old Ironsides." Nearly opposite, on the Boston side of the harbor is the site of its launching and a bit farther south lies Griffin's Wharf famous as the site of the Boston Tea Party. From our vantage point we are again impressed by the excellent harbor and docking facilities of the modern city. Returning to the street we find ourselves besieged by small sons and daughters of sunny Italy. All are anxious to conduct us to Paul Revere's House, only a short distance away. We are led thru a veritable "little Naples" for this area of old

Boston is occupied almost entirely by Italians. The Revere House is typical of the architecture of its day, having been built about 1675. It is filled with mementoes of that versatile patriot some of whose excellent silverware may be seen in the Museum of Fine Arts.

Conclusion

Many other places both new and old could claim our attention but all tours must end. We soon find ourselves again at the airport and in a few moments our farewells are said and we are aloft. As we circle the city we look out once more over the now familiar metropolis and hope to renew our acquaintance with a city so rich in historic shrines and yet so progressive, taking full advantage of its location and climate and hinterland to become a modern world port.

THE USE OF TOY PROJECTION AIDS IN THE TEACHING OF GEOGRAPHY

Harold Gluck
Walton High School, Bronx, New York

No one any longer doubts the value of visual education in the teaching of geography. The main problem for most teachers and schools is where to find funds for such equipment. The purpose of this article is to show how suitable equipment may be obtained at little or no cost.

Within the last few years a great variety of devices have appeared upon the market, which in one form or another, project an image upon a surface. These have been sold primarily for the amusement of children. I have called these devices "toy projection aids" and they can be used to great advantage by the geography teacher.

Map Drawing

One of these "toy projection aids" solves an eternal, baffling, and vexing problem that has annoyed teachers since the birth of geography. "How to get the student who cannot draw a map to draw a map that looks like a map?" Educators, principals and supervisors in many cases insist that map drawing is an essential and integral part of geography teaching. But all the insistence in the world still doesn't get the student to draw the map. Progressive teachers have learned how to successfully stimulate the student to draw the map. The snag in the procedure is the actual drawing of the map. Some teachers use cardboard outlines which enable the

student to trace the outline of the map on a sheet of paper. Others distribute outline forms which may be filled in by the student. Some encourage tracing of a map. Others use any one of a score of different devices. Yet there is a simple "toy projection aid" sold under different names on the market which banishes our worries and actually does two important things. It makes the student want to draw —and miracle of miracles—it improves his drawing ability in many cases. This machine projects a picture or a map upon a sheet of paper. Used with a seventy-five watt bulb it does not strain the student's eyes. The student can copy a map of a state, country, or section of the hemisphere. Original combinations can be devised by use of this machine. First a map can be drawn. Then a symbol of a product can be flashed upon the map and copied. One model of this machine sells for $3.00 and another for $1.50. There are an infinite variety of uses for this machine.

POSTAL CARD PROJECTOR

There is another "toy projection aid" which is very old. At one time it was used frequently by teachers. Today its use is rare and it seems to be hardly known by our present generation of teachers. It is the good old fashioned postal card projector. Insert a postal card, a photograph, a picture cut from a magazine and it may be reproduced upon a screen. For class room use, two seventy-five watt bulbs should be used. If the picture you are going to project is to be used several times with different classes, it is advisable to glue it onto a piece of cardboard. Otherwise the heat will cause the paper to curl.

The method of using the postal card projector will vary according to the occasion. Students should prepare the pictures. They can cut them out of the daily newspaper, the special Sunday supplement and photo sections of many large newspapers, any one of the many photo magazines that have appeared during the last two years, or out of any of the geographical magazines that are used by the teacher. Travel magazines, free commercial books, and travel folders will also offer a supply of pictures. As a form of project work, a student or group of students may prepare a talk or an illustrated lecture upon an assigned topic. This topic may or may not be correlated to the lesson of the day.

If the local environment offers geographical possibilities, the students can take photographs using any camera that they may possess, or any of the numerous cheap cameras which have recently appeared upon the market. These sell for $1.00 or less and the pic-

tures may be projected upon a screen by use of the postal card projector. There is a "toy projection aid" at present being sold which can be used either to project pictures upon a sheet of paper for individual copying or upon a screen so that the entire class may observe the picture at the same time.

WHAT TO USE FOR A SCREEN

If your room is not equipped with a motion picture screen there are many substitutes that will serve the purpose. An old white window shade can be used. Or a large sheet can be hung up in the room. If the back of your room is painted either white or yellow, you can use the wall itself as a screen. A large piece of cardboard or beaver board painted either white or with aluminum paint will serve the purpose. And finally, you can buy a tripod folding base toy screen for about $1.50.

THE MAGIC LANTERN

The magic lantern has had a peculiar history. At one time it was practically the only means of projecting a picture upon a screen. It was used in the teaching of geography and other school subjects. I had one of the early arc light magic lanterns and it required four men to move it. Magic lanterns were later sold as toys. Their use is rather infrequent today as a toy but they still can be purchased. In the school system the magic lantern has developed into the modern efficient slide projector. If you can get a magic lantern it may be used to good advantage. Slides may still be obtained for these machines. However, the students can make slides for them. Glass plates may be purchased which are made especially for lantern slides. Using a crow-quill pen and India ink it is possible to draw or write directly on glass. When the ink has dried, a lantern slide mat is placed upon the glass plate and it is then covered with a lantern slide cover glass. The two glass plates are then bound together with tape and the slide is ready for use. I would suggest that at first maps and simple diagrams be drawn upon slides. If too complicated a picture is attempted the students will quickly become discouraged.

MOTION PICTURE EQUIPMENT

There is no longer any suitable excuse that a teacher can give for not using motion pictures in the teaching of geography. Films may be obtained free or at the cost of transportation. But how about a 16 mm. projector? There are motion picture projectors, sold as

toys for children, which can be used efficiently in the classroom. Motion picture cameras are appearing on the market for $10.00 or less and they can be used to take pictures of important data that can be used in the classroom. If the teacher takes a trip during the summer or holiday vacation period, the camera should be a constant companion. Some of the cameras are foolproof in the sense that the student can use them successfully after a few simple lessons have been given in the taking of scenes. And some of the 8 mm. cameras can be operated by even a five year old child.

STILL FILM SLIDES

At one time 35 mm. projection machines were sold as toys for children. The 16 mm. and 8 mm. projection machines have forced them off the market. They are still in stock in many places and may be bought for $3.00 or less. It was while experimenting with a 35 mm. toy projection machine that I discovered several years ago that which should have been obvious—but unfortunately wasn't! These 35 mm. toy projection machines can be used to project 35 mm. still film slides. So if you can get 35 mm. still film slides you may use this toy projection machine. At present there are being sold on the market various 35 mm. still film cameras, which take 50 or less exposures per roll. One of these cameras has been sold as low as $7.00 and they may be bought second-hand. With this camera you can take still pictures. If you so desire, the developed pictures can be shown with the postal card projector, or the 35 mm. negative can give you a 35 mm. positive which can be used as a still film slide and projected with the toy 35 mm. projection machine.

HOW TO GET THE EQUIPMENT

While there are many other toy projection devices, I feel that the use of any of the above described machines will keep the teacher and her students quite busy with geographical matters. There is one important question which must be answered, namely, how to get the equipment? If funds are available, that of course would solve the difficulty as only a small sum is needed. But if no funds are available, the matter may be discussed with the students in the geography class or brought before the attention of the entire school body. You are bound to find either a student who has one of these toys or who has some friend or relative who possesses them. Three months after the average toy is bought, it is "dead" and rarely used. The students will be glad to either lend them or donate them to the school.

SAFETY SUGGESTIONS

In handling these machines the students and teachers must be careful of the electrical connections, for in some cases the terminals of the 110-volt circuit might easily become exposed to contact with the child's or teacher's fingers and cause injury. Always be careful to check all equipment and see that there are no loose edges which might cut the hand.

FREE SOURCES OF FILMS AND SLIDES

There are many sources where free films and slides may be obtained. In New York and Chicago, films are supplied to the schools by the Boards of Education. In New York, the Metropolitan Museum of Art and the American Museum of Natural History distribute films free of charge. The Departments of Agriculture, Labor and Interior, all issue free films. The Goodyear Tire and Rubber Co. of Akron, Ohio, has a motion picture department. A catalog of films is issued by them. Films are free and they pay the cost of transportation to the exhibitor and the exhibitor must only bear the expense of return of films.

The American Council on Education has published a study entitled, "Teaching With Motion Pictures," Series II, Vol. 1, No. 2 and it contains a partial list of film sources. The United States Office of Education has developed a list entitled, "Sources of Educational Films and Equipment," Circular No. 150, and it may be obtained free by writing to the U. S. Office of Education, Washington, D.C. In the January, 1937 issue of *The Social Studies,* there is an article by G. Hotchkiss which describes some films that can be used in the teaching of geography and the sources from which they may be obtained. Professor Wesley has a list of sources for films and slides in his book, "Teaching the Social Studies."

CONCLUSION

In general any one of the following methods might be used with these visual aids:

1. As special project work.
2. As assigned class work.
3. As committee work.
4. As part of the Geography Club work.
5. As home work.
6. As student-parent work, in which case the parent cooperates.

Visual education is a powerful factor and it can do much to accomplish the leading objective in all geography work which is to teach pupils how to think in geographical terms and see things with geographical eyes.

AN AUSTRALIAN SHEEP STATION IN WESTERN NEW SOUTH WALES

MABEL BELDEN
Keuka College, Keuka Park, New York

Sheep "stations" as the huge ranches of Australia are called in the regions of low rainfall, represent the adaptation of a highly cultured race to areas which are occupied by nomads in the Old World. For Australia's inhabitants are ninety-seven per cent British and over two-fifths of the area has rainfall of less than ten inches per year. To this may be added a still larger area which is arid because of the greater evaporation in the tropics and also an area in which rainfall is very unreliable and therefore unsuitable for agriculture.

The western part of New South Wales, over two-fifths of the state, is of this type and there sheep raising is the sole primary industry. In the heart of this area is Broken Hill, the mining town famous for silver, lead, and zinc. It was a boundary rider on a nearby station who in 1883 discovered this mine and thereby became a wealthy man. The region outside the little city is still station country and is an interesting example of life "outback." The development of the mine has been a boon to station owners for it has meant that a railroad is relatively near by. Two trains a week make a twenty-four hour trip to Sydney and four trains a week reach Adelaide in South Australia in an overnight journey.

As soon as the traveler leaves the small city, the paved road ends abruptly and the "track" begins (Fig. 1). In these days of motor cars, it is not difficult to make a day's visit to a station sixty miles away if the weather is fair, but in the winter season, one hears much of the hazards of rain. It is then that dry creeks may become sizeable streams, impossible to cross, and the car may be marooned for hours or even days waiting for the creeks and mud to dry up sufficiently to make the roads passable again. For longer distances, too, automobiles and trucks have largely taken the place of the camel which is now used largely for the heavy loads for which there is no great hurry.

The "track" to the station is not marked. Apparently either one knows the way or takes a chance. This is the mulga country where the acacia is king. Mulgas, a species of acacia, are small trees, usually only twenty feet high when fully grown. They are said to be a beautiful sight when covered with blossoms in the early springtime.

The dominant undergrowth is the saltbush and bluebush which is generally much more abundant than grass. It looks something like the sagebrush of western United States, being a low bush about twelve inches high with gray fleshy leaves which are much liked by sheep and other stock. Wild life is not lacking. Kangaroos hop away more swiftly than the car can hope to move on the rough road. They leap along on their hind legs, their huge tails swinging up and down

Fig. 1. "Track" to Netly station, sixty miles from Broken Hill, New South Wales. Notice the mulga trees in the distance and the low bushes either side of the road.

to preserve their balance. Emus, those great birds which resemble ostriches, are frequently to be seen and overhead flocks of galahs are spots of beauty with their silver backs and rose-colored breasts.

THE HOMESTEAD

The station boundary is marked by a gate and many more of these indicate the "paddock"* divisions before the "homestead," as the home of the manager or owner is called, is finally reached.

After traveling for miles in the "bush," the homestead is a surprise. Suddenly there appears a group of buildings: the comfortable, often lovely home of the owner or manager (Fig. 2), quarters for the thirty or more workers who are regularly employed on the station, a store for supplies, a wool shed where the shearing is done and a huge tank for the water supply (Fig. 4). This is a huge oblong hole excavated in a clay depression to a depth of twelve to fifteen feet. Leading to it are wide ditches which serve to fill the tank if

*The word "paddock" seems to be used for any fenced area, large or small.

and when there are sharp torrential showers. Their infrequency is one of the hazards of station life.

All this has the appearance of a little township. The owner's home is most conspicuous, with wide, shady porches, comfortable large living room with books and fireplace and piano; a garden for flowers and perhaps another for vegetables and fruit trees; a grass plot and trees for shade and beauty. Everywhere the owners are

Fig. 2. The wide porches at Netly homestead. The plot of ground in the foreground is the only bit of lawn and is inclosed by a high, white fence. Flowers, vines and trees add to its attractiveness.

noted for their hospitality not only to guests but also to the casual traveler who passes thru their property.

CARRYING CAPACITY OF THE LAND

But where are the sheep? Perhaps there were none to be seen for the sixty miles and none are in evidence here. This is the region where the average carrying capacity of property is about one sheep to twenty acres and the minimum economic flock is at least five thousand sheep. As a matter of fact, most properties are much larger than the 100,000 acres which this estimate would imply. Netly and Mundi Mundi, two typical stations in the Broken Hill area, have approximately 500,000 and 350,000 acres respectively.

Only a small percentage of the land is used for pasturing at one time. It is then left to restore itself for a few years. Conservation

of such areas is a much discussed question in Australia for overgrazing has meant the ruin of large areas which have now become sandy deserts. Not only does the annual rainfall have to be taken into consideration but also its unreliability. The "drought risk" in this area is considerable and means that acreage must be especially large to insure careful restoration of grazing plants and grasses. Large areas too are much more economical in overhead expenses, such as buildings, shearing sheds, and the like. The optimum economic area is often much larger than a "living area." Mere

Fig. 3. The musterers and boundary riders with provision wagons and horses about to leave the homestead for several days' stay in some distant part of the station property.

size, however, does not insure the careful use of the land. If present gain is the dominating motive, the large owner may be just as careless. Many of them have been accused of overstocking, with results just as disastrous to the future of the land as if conditions had been beyond their control.

Organization of Station Life

Organization of station life is much the same on all stations. If the station is a single property, the owner is probably manager as well. If the station is owned by a pastoral company, the manager probably occupies the homestead and directs the work of the station as well as the buying of supplies and probably the selling of the wool. Frequent trips are made to Sydney or Melbourne or Adelaide by car or train. On many stations, there is a landing field near the homestead which makes possible one other means of communication with the outside world. Telephones are common in these modern days. Where stations are too remote, often the so-called pedal wireless makes it possible to send out messages.

The overseer usually directs the work of the men. There may

also be a secretary and nearly every station has a "jackeroo," a young man who is under training for the profession of overseer or manager. The jackeroo may be called upon to do something of all types of work on the station from repairing fences and mustering sheep to the planning of the work and the ordinary clerical and bookkeeping work. He is a sort of apprentice and has more intimate contact with the overseer and manager than with the men.

The main body of workers are the boundary riders and musterers, who, as their names suggest, repair and build the fences

Fig. 4. Professionals building the water tank at Netly station.

and take care of the sheep. They often leave the homestead for days at a time taking with them provision wagons, camping outfits, and horses so that they may work or take care of the sheep in some remote corner of the station (Fig. 3). Their ability to ride a horse is much the same as that of our western cowboy. Mrs. Aeneas Gunn has written a novel "We of the Never-Never," the story of life on a cattle station in the Northern Territory, which proves that Australians also have the material for colorful stories of life in the "wide open spaces."

Many stations have out-stations, buildings which serve as temporary quarters in the remoter parts of the property. These are sometimes equipped with telephones connected with station headquarters.

SHEEP SHEARING

The most picturesque time on a sheep station is shearing time. In this region, this occurs in the late winter or early spring—August or September. The shearers belong to a union and travel from station to station spending a week or two at each. Shearing is done in

a huge shed which is especially built for the purpose. Merinos are the favorite breed in these areas and some of the finest fleeces to be grown in any part of the world come from this region. Inside the shearing shed, all is activity. The shearers are bent on shearing as many sheep as possible and are adept in the use of electric shears. Each shearer usually shears more than one hundred sheep a day. Classifiers run a practiced eye over the fleeces and put them in bins marked by classification number. The bins are constantly emptied by men whose job it is to bale the wool, mark it with its classification number, and the name of the station. Bales weigh about 360 pounds. By the end of the day, the wool is ready for market and will be sent to one of the port cities, probably Adelaide. Some of it is destined to be used in the small, but growing, Australian manufacturing industry but the major portion is sold in Great Britain and other foreign countries, including the United States and Japan.

Conclusion

This region is part of what is sometimes called Australia's "vast empty spaces." The problem, typical of much of the area of the continent, so large a part of which has insufficient rainfall, is one of conservation rather than of greatly increased settlement. When this area is wisely utilized, it is often a triumph of adaptability to difficult climatic conditions and a source of constant income to Australia but it hardly seems a region suited to greatly increased population and settlement on the land. Production may be increased by the continued use of modern methods and research, by further improvement in methods of transportation and communication, but there will always be the low and uncertain rainfall with which to reckon. Man may adapt himself and his way of life more and more to geographical conditions but those conditions are permanent and must be considered in all his planning.

THE CHANGING VEGETABLE OILS TRADE OF THE UNITED STATES

GEO. H. PRIMMER
State Teachers College, Duluth, Minnesota

The past quarter century shows such a pronounced change in our trade in vegetable oils as to suggest an almost complete reversal of national policy in that respect (Fig. 1). While United States leads

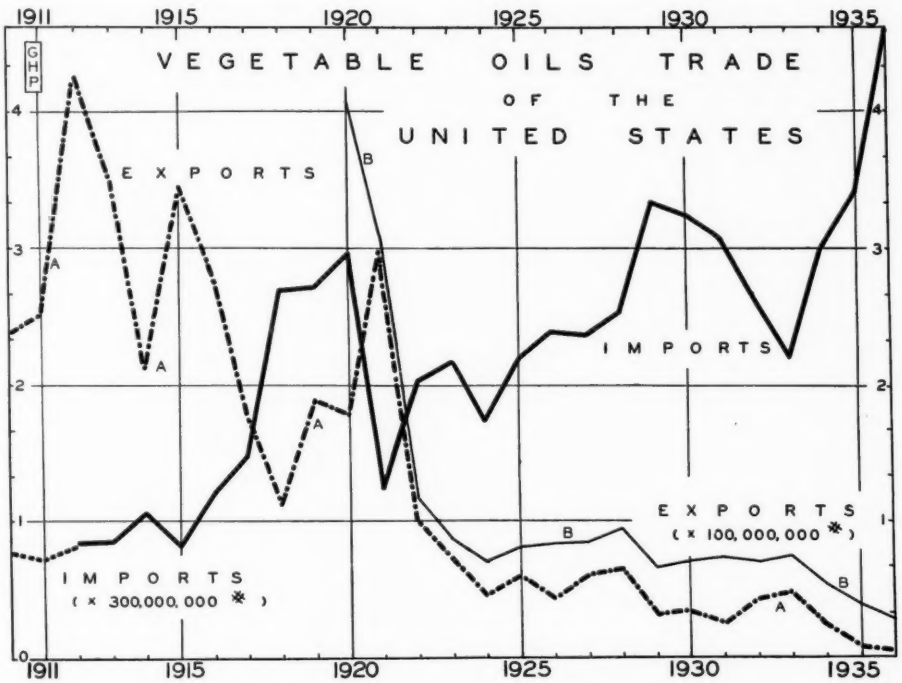

Fig. 1. In fifteen years exports decreased by more than eleven-twelfths, while in twenty-five years imports increased around six-fold; data for export line "A" include three kinds of oil and for line "B," seven items.

the world in production of certain animal fats, vegetables oils intrude their markets; besides, manufacturing industries, including some making many non-food products, but whetting their appetites upon home-produced vegetable oils, draw many hundred million pounds annually from abroad. Increasing imports enter despite protesting farm organizations, groups demanding heavy duties on oil seeds as well as on vegetable oils.

Declining Exports

Cotton seed. Exports of cotton seed oil dwindled from a high point of approximately four hundred million pounds shortly before the World War to less than 1 per cent as much for 1935-36. A notable reduction shows in sales to Canada which a few years ago took eight times the total 1935-36 United States export.

Around five hundred mills in United States express oil from cotton seed. For some thirty years the labor of twelve to twenty-six thousand persons produced oil and other derivatives valued from one to well over five hundred thousand dollars annually. Tho the oil enters into putty, roofing tar, glycerin, and nitro-glycerin, making lard substitute continues its chief use. In 1935, besides utilizing a billion pounds of home production, United States purchased abroad some 160,000,000 pounds of edible cotton seed oil.

Corn. Tho never large, corn oil exports have declined fairly consistently since 1909. Notwithstanding, it remains the only considerable producer, in 1935 United States eked out the supply from its factories by some 25,000,000 pounds of corn oil import. It serves largely as salad oil, cooking fat, and margarine component. Its low price recommended its experimental use (¼%) as adhesive in lead arsenate sprays; its results but equalled those of linseed and of cheaper fish oils.

Others. Declining export characterizes our trade in several other oils—linseed, soy bean, coconut, peanut, and cocoa butter. In general, this incomplete list names oils existing in increasingly greater amounts in our country but in increasingly greater demand for use as raw material in its factories.

Increasing Imports

Coconut. Low latitude Philippine Islands, profiting from freedom from duties, sends United States nearly all the coconut oil and copra imported; but small and decreasing amounts enter from British Malaya and the sparsely peopled outer provinces of Netherlands Indies. Congress recently imposed a Philippine quota of but 448,000,000 pounds duty-free oil and a three cents per pound processing tax. President Roosevelt asked reconsideration and suggested that some less drastic way of helping United States dairymen might be evolved. President Quezon, October, 1937, however, recommended a long list of ways to expend oil-processing funds including dispensaries, public schools, and Mindanao colonization.

United States buyers closely watch the Manila copra market, intensely interested in such quotations as "warehouse grade 'resecado,' 9.50 to 9.75 pesos per kilo," or, that copra prices declined with the forecast of a heavy United States cotton crop (cotton seed

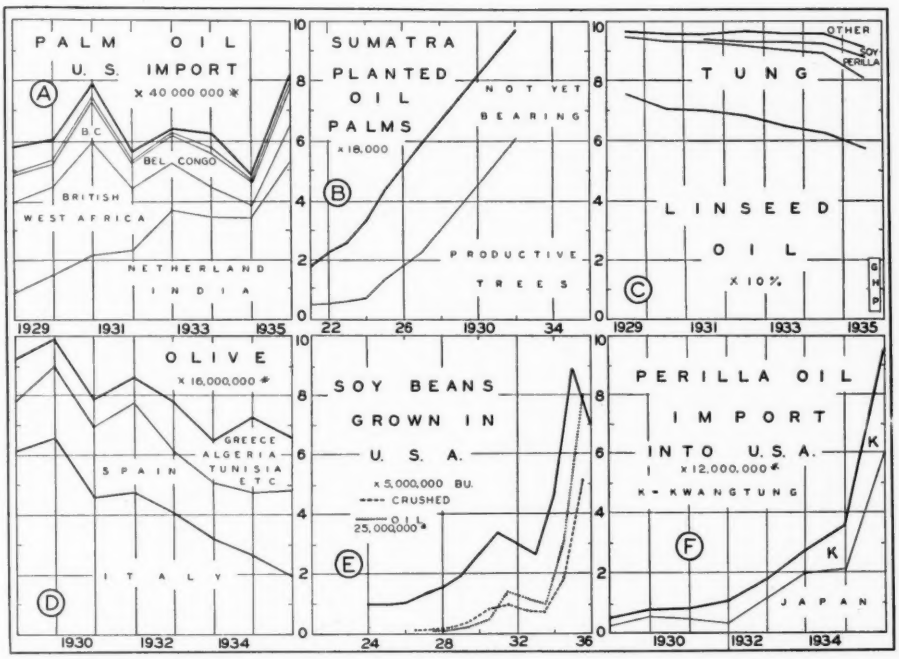

Fig. 2. Grafs of recent changes in vegetable oils production and trade. "C" shows percentage of various oils used as vehicle in United States paint and varnish industry. "D" shows a declining import into United States; olive oil costs rule higher than for most others while current import duties run as high as seventy-five per cent.

oil competes with copra). Since perhaps one-fourth of our national use of coconut oil enters into margarine it competes strongly with dairying. A greater weight of copra than of oil, together with some 103,000,000 pounds of copra cake entered United States in 1935. This significant amount of "poonac" complements other available dairy feeds. Coconut oil, solid in temperatures below 74°F., comes from the Philippines in tankers fitted with steam coils to reduce the oil to proper fluidity for unloading.

Coconut oil serves to anoint bodies and hair of low latitude natives. Middle latitude residents may deprecate such practices tho fresh from a coconut oil soap bath and a shampoo employing emulsified oil. Almost two-thirds of our imports are used in soap-making, and most of the other third goes into margarine, but small

amounts show in lard compounds. Coconuts furnish the only oil satisfactory for marine soap, one lathering freely in salt water.

During 1913-22, while world copra production increased but 89 per cent, Philippine output rose 288 per cent. Sales of coconut products helped Filipinos purchase, largely from United States, cotton, iron and steel, mineral oils, autos, meat and dairy products. San Francisco mills process much imported copra, much more than moves to remoter Atlantic ports. Ceylon long since favored independence for Filipinos, since Philippine copra would then face the same tariff barrier.

To 1915 Philippine export of coconut products to France exceeded that to United States. An estimated one-tenth commercial coconuts grows on "European" owned plantations and probably less than one-half on cultivated trees. Change of political status might easily spell disaster to many Filipinos financially dependent upon coconuts, this despite better quality copra associated with the shift from smoke (tapahan) or sun to artificial (hot air) drying.

Palm. Probably the optimum mean annual temperature of 77° restricts palm oil production to the tropics, where it long served the African Negro as food and as unguent—smeared on the body as protection against hot winds and insects. Tho harvested largely from natural growth, plantations are gaining headway and cheap, efficient, Chinese labor readily picks the nuts from thinly planted low trees, trees with no need to stretch far upward for light and air.

United States imports some palm oil from Nigeria and Belgian Congo. Since 1911, modern factories have expedited export from Congo Basin areas of abundant trees. Lacking the political affiliations with west Africa possessed by Great Britain and France, we obtain increasing amounts of palm oil from Netherlands Indies as Sumatra plantings reach bearing age. Nearly all Sumatra oil leaves from Belawan which constructed its first storage tank in 1926. Tank ships offer cheapest transport.

United States receives annually around eight million pounds of edible palm kernel oil which is utilized largely for margarine. We also buy several times as much of palm nuts and palm kernels, of inedible kernel oil, and of inedible palm oil. Netherlands sold us, January-October, 1935, some 10,000 tons of palm kernel oil, likely expressed from nuts brought from Netherlands Indies. Some inedible oil enters into lubricants, especially into railway axle grease. Edible oil finds increasing use with bakers. Perhaps one should not

expect tremendous increase in oil palm imports for in France industrial demand shifts from palm to coconut oil.

Olive. Natural environmental conditions locally invite, but high wages in United States makes growing oil olives unprofitable. Olive oil imports all come from comparatively densely peopled lands about the Mediterranean. The largest, but decreasing, amounts originate in Italy, and increasing quantities come from Spain, Greece, and north Africa. Tho ranking first among importing countries, United States rates far below Italy, Greece, and Spain in per capita use. In 1935 we brought some seventy million pounds of this relatively expensive vegetable oil into our country. Considerable mixing and substitution characterize its important salad and sardine uses.

Tung. Tankers bring from China, in part via Hong Kong, nearly all tung oil supplementing our production. Since the poisonous cake, like that of castor beans, possesses only fertilizer value, expressed oil, rather than beans, enters United States. Tung nuts (experimental planting began in 1906) grow well in the lands of little frost in southeast United States. Cheap machine extraction, in due time, may yield enough high quality oil to supply national needs. Paint and varnish manufacturers made some of the experimental Florida plantings. Perhaps 300,000 acres in bearing trees would obviate need for importation, now about one pound per capita.

Tung oil burned with properly regulated air supply helps make the best Chinese inks. In United States tung oil not only enters into making of waterproof paints and varnishes, less likely to crack than those including kauri gum, but into insulations, fish net preservative, auto brake linings, gaskets, and undercoating of motor car finish. In a recent year a quarter million gallons helped form roll-up tubes for such things as shaving creams.

Perilla. Perilla oil dries less readily than linseed oil and so rates less desirable for varnish. Some manufacturers mix it with soy bean oil for improved drying quality. Besides paint and varnish, linoleum making requires a large share of our import, reaching some 115,000,000 pounds annually of oil alone.

Japan ships United States the largest amount, and in rapidly increasing quantities and Kwangtung ranks as second shipper. Small consignments move in steel drums but most comes in bulk, carried in the deep tanks of freighters. Experimental plantings in various parts of United States in 1917 and in 1925 proved none too promis-

ing. Early harvesting means a large percentage of immature seed and later is likely to result in much loss thru shattering. If home grown perilla seed is offered in quantity, mill equipment used for flaxseed, soy beans, and cotton seed could express the oil.

Other Import Oils. United States imports earlier included significant amounts of cocoa butter and of six other oils: cottonseed, castor, linseed, peanut, rape, and soy bean. Use for transparent soap, dressing leather, and fly paper coating requires castor bean import; war demand rose highest as the oil in airplane motors remains liquid even with thirty degrees of frost. Linseed imports are derived largely from relatively warm Argentine and warmer India, the expressed oil being used in printing ink, in the vehicle of paint and varnish, and in linoleum.

Home-grown peanuts, aided by duties of seven cents per pound on unshelled nuts and on oil of about thirty cents per gallon, now meet most of our requirements for fulling cloth, tinned fish, and margarines. Small amounts of rapeseed oil from Argentine, Japan, and British India enter into soap making, quenching steel, and the oiling of woolen cloth. Corn Belt production did much to make United States nearly self-sufficing in soy beans and soy bean oil.

The Future. This paper makes no attempt definitely to forecast future events, but to give a partial basis for understanding oil trade changes as they happen. It properly suggests that United States shows considerable maturity along one more line; that it largely ceased exporting vegetable oils as a raw material for other areas, and developed a tremendous demand for imports to supply its oil-using manufacturing plants. We likely shall have to decide whether we shall come more and more to depend upon low latitude or cheap labor areas or produce our own oils; likewise, we face the companion problem of deciding whether we shall cease so largely to depend upon animal fats and turn to more use of vegetable oils, heretofore taken to connote a relatively low living standard.

A HOPI INDIAN PROJECT

CAROL Y. MASON AND WINIFRED RUTZ
State Teachers College, Maryville, Missouri, and Wisconsin Avenue School, Milwaukee, Wisconsin

Children of the Milwaukee schools study Indians as a part of their history work in the third grade. Last year Miss Winifred Rutz decided to use a geography project showing the life of the Hopi Indians as the basis for all of the work of the first semester, in her third grade at the Wisconsin Avenue School. The book *Land of Little Rain* by Muriel Fellows was the core of the project. Vivid, beautifully illustrated, full of fascinating and authentic information, and written at the third-grade level, it captivated the children from the first, and led them into an enthusiastic portrayal of Indian life which attracted attention in other schools as well as their own.

MOTIVATION AND PLANNING

Miss Rutz began by reading the first few pages of *Land of Little Rain* to the children, who immediately wanted to act out the story and do everything that the Indian children Moho and Sah-mee did. The desert setting and the desert home are described little by little, thru the story, as the small boy and girl go about their daily work and play. The school children unconsciously absorbed the feeling of life in an arid country, and noticed every detail of clothing, food, shelter and activities so different from their own. They read everything they could find about the Hopi Indians. Many of them had just reached the age for obtaining a library card, and brought in books from the library and books from home. These, together with books belonging to Miss Rutz and to the school, were kept on a low round table at the back of the room, around which the children gathered for reading and planning.

CONSTRUCTION OF HOUSE

At the back of the schoolroom the children built a Hopi house to represent part of the pueblo. They brought orange crates, sixteen large ones and twelve smaller ones, to make the two rooms of unequal height. Two crates, one on top of the other, formed each corner and door post of the house, and were held together around the top by strips of wood about an inch square and eight feet long, furnished by the school. This made rooms in which most of the children could stand upright. Four-foot wrapping paper, also furnished by the

school, was then wrapped around the entire outside. A second story was indicated by paper pasted on the wall above one end, with door and window painted on it. The chimney was painted on the wall above the roof, and the fireplace on the inside wall under it. The roof was supported by heavy cord strung diagonally across the top, with paper laid over it. Doors and tiny windows were cut in the walls, and a ladder made from lathes which the children obtained from a house that was being torn down in the neighborhood.

House and Climate

In this way the class obtained a fair representation of the type of house in which the little Moho and Sah-mee lived. They noticed that it was built on a flat-topped hill called a mesa, and that most of the materials were stone or clay because there was so little wood to be had in that dry land. The beams that held up the roof were large ones taken from an abandoned house, where they had been brought many years before, perhaps from a forest several miles away in a rainier place, or higher up the river on the edge of the mountains, where rains came more often. They noticed that the old beams were still hard and firm, not at all rotted as they would have been in a humid climate like that of Milwaukee. The thick stone walls kept out some of the cold of winter nights, and also kept out the heat of the blazing desert sunshine. Even the windows were small to keep out the hot sun. The little rooms of the paper house were hot and stuffy, and the children commented on what it would be like to live in a home with such small windows. The roof could be flat and covered with clay because the rains came very seldom, and there was hardly any snow in winter. No need to have a steep roof for water and snow to slide off.

Pueblo Interior

The children were very particular to have everything done exactly right. Feathers were placed under each corner of the house, to bring good luck, and corn meal sprinkled under all the walls to feed the gods of the house. A thirteenth small orange crate was placed in the small room as a bed, and covered with an Indian rug which belonged to one of the children. They noticed that nights in the desert were cold, for Sah-mee slept under woolly blankets and sheepskins, even tho he did not need a coat during the day. In one corner of the large room under the painted chimney they placed a flat stone which some of the children had brought from the neighborhood, and propped it up with other stones under the corners, to serve as a

cooking stone in their fireplace. Strings of dried corn cobs were hung under the eaves, but it proved impossible to obtain peppers.

CORN AN ESSENTIAL

The dependence of the Indians upon corn was well brought out. It grew on the little farm along the tiny stream at the foot of the mesa, and Sah-mee's father said that if the corn did not grow the people would starve. The native American grain was depended upon by many Indian tribes, when wheat was unknown on this continent, and even today Indians do not make white bread but use the corn just as their ancestors did. Corn grows well in the warm sun, but requires water too, and on the edge of the desert where rain cannot be depended upon and rivers and springs sometimes dry up, the ever-present danger of famine makes itself felt in Indian life. For little folk who are used to having a store near at hand where food may always be bought, the concept of absence of food is difficult, and needs emphasis in connection with every evidence of little rain, with the progress of the story.

Corn, meat, and a few vegetables, made up the diet of the Indians, and corn is especially stressed. The breakfast dish, puvulu, was made with a dough of corn meal, sugar and water dropped into hot mutton fat to cook. At noon the family often ate a stew of meat and corn and chili peppers, while at night they sometimes had pancakes of corn meal fried on the flat stone in the fireplace. Corn was important in other ways too. Moho played with a corncob doll, while Sah-mee made the handle of rain-dance rattle from a dried corn stalk. Corn meal was often an offering to the gods. At the ceremony of naming the new baby boy the old grandmother's wish for his future was "May you have good corn," and she held corn to his mouth while they held him up to the sun in the early morning and sang the sunrise song.

DESERT LANDSCAPE AND PLANTS

Behind the paper pueblo house the children painted a desert and mesa landscape on the blackboard with Alabastine paint (calcimine). They chose those who could draw best, to put on the outlines, using the frontispiece of Holling's *Book of Indians* as a guide. The rest of the children did the coloring. The story drove home to them the desert landscape and lack of water, in many ways. The hot sun baked the soil hard, not only on the trail where Sah-mee's moccasined feet ran lightly out to the rabbit hunt, but in the cornfield

where his father had to scratch up the earth around the plants with his pointed digging-stick. Moho had to put on her buckskin leggings to keep the thorny desert plants from scratching her and the snakes from biting her. Most of the plants are small, like bushes, altho there are a few small trees along the wetter hollows where streams flow after rains. It was necessary to hunt for a small log of wood large enough to make Sah-mee's toy drum.

Many of the desert plants are useful, one of them being the yucca with its tall clusters of pearly white blossoms. Its stiff sword-shaped leaves are sharp as knives, but can be chopped off and gathered in a bundle to take home, where grandmother dries them and weaves them into baskets. Some of the leaves are colored with dye made from seeds and berries, to make the designs. The root of the yucca is pounded to pieces with sharp stones and put in a jar with clear water, where it makes a foam like soapsuds, with which Moho washes her hair. Paintbrushes for painting designs on pottery are made from the leaves.

WATER WHERE IT SELDOM RAINS

The same scarcity of water which makes it uncertain whether there will be enough corn to eat, and which causes the dry, baked earth and scrubby plants of the desert, also makes it hard for the family to get enough water to drink and to use for washing. Moho had to help her mother by carrying a heavy jar of water from the spring at the foot of the mesa up the steep winding trail where her feet slipped in the hot sand, to the house. Altho they kept all the rain water they could collect and melted the little snow that came in winter, saving it all in big clay jars, they could not get enough to last long. But rain falling on top of the flat mesa soaked into the ground, down thru the rocks especially where there were rocks made of sand, and came out in springs along the base of the cliff, where they could gather it from its natural storehouse and use it. One reason for having the cornfields at the bottom of the mesa is because of this water supply, but the water has to be carried up to the top for use in the pueblo.

Lack of rain is further emphasized by the rain dance, the snake dance, the offerings to the rain gods, and the Indian children's play which imitated some of these activities of their elders. The school children also were fascinated by the making of drums and rain-dance rattles, in order to dance and pray for rain. They noticed that Sah-mee's father frowned when he saw a blue sky with no rain clouds in sight, which seemed a strange attitude indeed to children

of a humid climate where frequent rainy days mean no chance to play out-of-doors. Looked at from this new point of view, rain became a very important matter to them. One of their favorite designs for pottery was "Clouds and Rain" which showed a flat-bottomed fluffy cumulus cloud with rain falling from its base. If such a project is worked out in spring the children can see those same clouds from their own school yard, compare them with the great thunder clouds, and with the thunder clouds which brought rain to Moho's and Sahmee's country where the "thunder bird" is sacred.

MATERIALS AND ARTICLES USED

Altho much of the material was impossible to get, the children were ready with satisfactory substitutes in many cases, and their quick imagination led them on from one part of the project to another. They planned everything themselves. In building the house they measured and decided how much of each material should be obtained, and then as in the case of the wrapping paper, told the teacher how much to get. They took care to have the windows on the side where they would get the most light. They borrowed or made as many implements as possible. The pointed stick with which the ground was prepared for planting corn, the wooden box for grinding corn, the drums and other things they constructed out of material brought from home. The large pueblo drum was made from a container for paint drums, secured from a paint company where a friend of one of the children worked. The whole class grieved because it was not possible to get a piece of rawhide for the top of the drum. Each child made his own individual drum by tying a cloth over the top of an oatmeal box. They gathered willow twigs and tied a bundle of them to a stick, making an Indian broom with which they swept their house. But the twigs had been gathered so late in fall that they were too dry and broke, so that it became necessary to use the brush which belonged to the schoolroom dustpan. Vases used in the school for still life drawings were borrowed from the Art Department and found to be of proper size and shape to use for the great water jar, the round grinding stone for rolling corn, and other purposes. One child brought Indian jewelery from home, another brought the rug already mentioned.

SUBJECTS AND ACTIVITIES

In its art work the class made coiled pottery, for which the school provided fifty pounds of clay. There were fifty children in the class. The paint for pottery was Mural Tone paint, which does not wash

off and does not need to be shellacked. Indians would never use shellac, and the children would not willingly do anything the Indians didn't. Each piece of pottery told a story by design. Making Katchina dolls, the representations of Hopi gods whom the Indians believe to have danced the original rain dances, also involved art work. Cottonwood, which they learned grew along streams in dry countries, was impossible to get, but balsa wood was obtained from one child's father, who was in the airplane modeling business, and the dolls were carved with knives and razor blades, and painted correctly.

The project furnished opportunity for almost every kind of third-grade activity, and is an excellent example of the adaptation of a geography project used in socialized teaching. Where the teacher is geographically trained, as in this case, the geography learned is not confined to matters of food, clothing and shelter studied in the allotted geography period. Ordinarily costumes would have been made and a rain dance given for the whole school, with music and steps planned by the Physical Education Department, but this was impossible because of a ban on school assemblies during an epidemic in the city. In history the children compared the Hopis with other Indian tribes and learned not only of the tribal customs but of the differences brought about by variation in climate and relief of the land they lived in. In music they sang Indian songs to the accompaniment of their drums, in Art they modeled pottery and drew twelve large pictures showing phases of Indian life, and in arithmetic they learned the practical value of measuring in feet and yards. They had much practice in writing, for they wrote stories or made up speaking parts where there were none in the book, and acted out many incidents. They also read aloud, gave some audience readings when they found bits of poetry or interesting prose, and wrote notes to other classes asking permission to give playlets and readings for the others.

Some of the plays which the children prepared and gave were "Getting Ready for the Rabbit Hunt," "The Rabbit Hunt," "Mother's Silver Bracelet," "The Katchina Dance," and "The Rain Dance." The room had many visitors to see the house, the paintings, the pottery and the plays. Visitors after a time began to trouble the class somewhat, because they took so much time from the assignments that it became difficult for the children to get their work done. A good "character mark" in "Effort" on the monthly report card depends partly upon getting assignments done on time.

Thus arose the need for organization, planning, and a system of guides. The children made a set of written guides for the visitors, voted on rules for conducting people around, and planned to take turns with the guiding, thus solving the problem. At the end of the semester the class developed its own test on material. They first gave questions to the teacher who put them on the board, then arranged them in order of importance and added others to be sure that they did not leave out any important points. This test was mimeographed at the office and taken by all the children in the grade.

VALUE OF PROJECT

In addition to the varied subject matter covered during the semester, the project taught courtesy, cooperation, observation, and accuracy in many ways. Children not only looked up material in books, but went to the Public Museum to see exactly how articles were constructed or painted. At the close of the work the entire class took a trip to the Museum, and a guide showed them the excellent Indian exhibits. It was an eager group which saw "real articles" and looked for details in material and pictures, to compare with their own construction.

INDIAN VOCABULARY ACQUIRED

Puvulu—Food, of Idian corn
Olla—Water jar
Mesa—Mountain with a flat top
Yucca—Desert plant
Pueblo—Indian village
Hopi—American Indian tribe in Arizona and New Mexico
Piki—Indian corn bread
Gourd—Bottle-shaped fruit
Metate—Grinding stone
Kiva—Indian ceremonial building
Katchina—Doll made like a Hopi god

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DE FOREST STULL, 1885-1938

MAYME PRATT RENNER

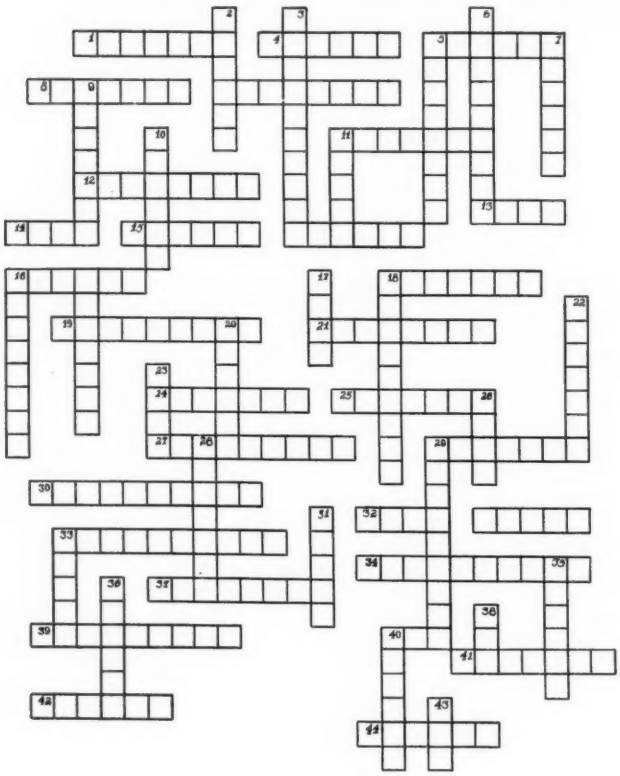
De Forest Stull died on December tenth at Harkness Pavilion, Presbyterian Hospital, in the city of New York. He was born in the little town of Richmond, Michigan, April 21, 1885, of pioneer American stock—the family being of French Huguenot, Knickerbocker Dutch, and Yankee origin. It was in Richmond that he received his early schooling, being graduated in 1901 from the public high school. In 1904, at the age of nineteen, he received the A.B. degree from Coe College, Cedar Rapids, Iowa, with academic majors in philosophy and geology. His college work was completed in three years despite the necessity for working his way thru school. At Coe, he developed two major interests: athletics, at which he achieved some prominence, and physiography, which later led him into the field of geography.

After graduation he entered upon a five year period of high school geography teaching, first at Canton, Ohio, and later at Danville, Illinois. In 1910, he married Mary P. Walsh of Detroit, and a few months later was called to a chair of geography at the State Teachers College, Marquette, Michigan. There he remained until 1924. The first sabbatical year, 1916-17, was spent at the University of Chicago, where he pursued graduate studies under Barrows, Salisbury, Goode, and Tower. In 1920-21, leave of absence was secured for further graduate work, under Smith, Johnson, Lehnerts, and MacFarlane at Columbia University. Scarcely had the year started, however, when a vacancy in the geography faculty of Teachers College occurred and Mr. Stull was offered and accepted a temporary staff appointment. The following two years saw him back at Marquette save for the summer sessions which were spent in teaching at Columbia. The second sabbatical year, 1923-24, brought him again to Columbia Teachers College, where he completed his work for the Master's degree, taught a part-time schedule in geography, and began his experimental work at the Horace Mann School. In the spring of that year, he received an appointment as Associate in Geography at Teachers College, which position he continued to hold until his death. During the summer of 1936, he visited most of the countries of western Europe while the academic year 1936-37 was devoted to advanced graduate study pointed toward the doctorate.

It was in connection with his work in Horace Mann School that he made the acquaintance of Roy W. Hatch, then Lecturer in History and Civic Education, an association which was to bear considerable fruit during the subsequent fourteen years. In collaboration with Mr. Hatch he produced one of the two or three most popular series of geography textbooks for elementary and junior high schools: "Journeys Through Many Lands," "Journeys Through North America," and "Our World Today." These were followed by a series of student workbooks in geography, a course of study for "The Social Studies in Horace Mann Junior High School," and "A Unit Fusion Course in the Social Studies for the Junior High School." Alone, he is the author of "The Course of Study in Geography in the Horace Mann School," and several magazine articles. His "Geography of Michigan" was but recently completed and will be published posthumously by Allyn and Bacon. He edited two maps of New York State for Denoyer-Geppert Company, performed rather wide service as an educational lecturer, and was active in both state and city organizations of geography teachers. In 1930, Mr. Stull was president of the National Council of Geography Teachers, and since then he has continued to serve on the Executive Committee of that organization. He was affiliated with the Methodist Church, was a member of Phi Delta Kappa and Kappa Delta Pi, and held the thirty-second Degree, A. F. and A. M.

During his thirty-four years of teaching, he served geography quietly, constantly, and whole-heartedly. Few are privileged to be as universally and warmly beloved by his students, or as affectionately regarded by his children as was Mr. Stull. The latter are De Forest, Jr., who was studying art in Europe at the time of his father's death; Walsh, a teacher of social studies at Radnor High School, Wayne, Pennsylvania; and Gertrude, a student at Smith College.

Teachers College, Columbia University
January 1, 1939



ALASKA

Oscar W. Dotson and E. Ray Casto
Emory and Henry College

Horizontal

1. The source of food for the Russian colonists in Alaska.
4. The northern geographic region.
8. The most southerly of the geographic regions.
11. The southern valley traversed by the government railroad.
12. The chief live stock.
13. A fur-bearing animal now protected on the Pribilof Islands.
14. A mineral of which there are great reserves but production is not sufficient to meet local needs.
15. The nation which purchased Alaska in 1867.
16. The mineral second in value in production.
18. A country of Europe in about the same latitude as Alaska.
19. A rich agriculture valley tributary to Cook Inlet.
21. The first white visitors.
24. A native group comprising about 50 per cent of the total population.
25. A valuable fish of Alaska.
27. A river of Alaska navigable 650 miles during four months.

29. A valuable fish of Alaska.
30. In a period of 63 years (1867-1930) the value of products was 217 times the purchase price.
32. The chief potential industry of the Arctic Plains Region.
33. The remote seat of government for Alaska for nearly a half-century.
34. The Canadian town at the head of navigation of the Yukon.
37. A serious insect pest.
39. A liquid mineral produced in small quantities. The estimated reserves are great.
40. A valuable fish of Alaska.
41. Two-thirds of the foreign trade is of this type.
42. The chief town of Alaska.
44. The northern valley traversed by the government railroad.

Vertical

2. A fish whose products exceed $40,000,000 annually.
3. Migrating laborers numbering about 25,000 who spend the fish season in Alaska.
5. A root crop suited to the soil and climate of Alaska.
6. The inland terminus of the government railroad.
7. A country of northern Europe whose area is less than one-third that of Alaska but whose population is more than one hundred times as great.
9. The middle geographic region.
10. A navigable southern tributary of the Yukon.
11. The city, founded in 1804, which became the seat of government.
16. A body of lawmakers chiefly responsible for the retarding of Alaska's development.
17. The source of $45,000,000 obtained by Russians during their occupation.
18. The first industry extensively developed and still first in rank.
20. An island on which the grazing period is six to eight months annually.
22. A valuable fur-producing animal.
23. A valuable fur-producing animal.
26. A mineral product which has yielded a total value 56 times the price paid for Alaska.
28. Dog- or reindeer-drawn vehicles used for transportation during the period of snowcover.
29. A primitive law granted Alaska in 1903.
31. A river providing navigation for 2200 miles in summer.
33. A mammal important in the Alaskan fisheries.
35. The port terminus of the government railroad.
36. A building stone exported from Alaska.
38. A valuable fur-producing animal.
40. The river draining the fine agricultural hinterland of Cordova.
43. A feed essential for indoor feeding and difficult to prepare owing to heavy summer rains.

KEY

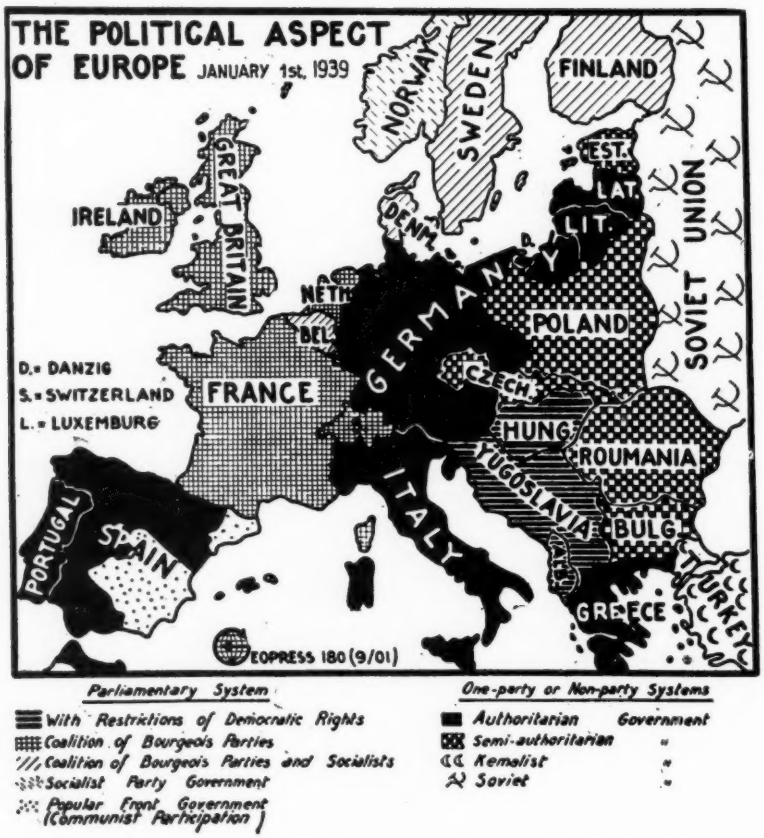
Horizontal		Vertical	
1. Siberia	16. Copper	2. Salmon	16. Congress
4. Arctic Plains	18. Finland	3. Transients	17. Furs
8. Pacific Mountain	19. Matanuska	5. Potatoes	18. Fisheries
11. Susitna	21. Russians	6. Fairbanks	20. Kodiak
12. Reindeer	24. Indians	7. Sweden	22. Muskrat
13. Seal	25. Herring	9. Central Plateau	23. Mink
14. Coal	27. Kuskokwim	10. Tanana	26. Gold
15. United States	29. Halibut	11. Sitka	28. Sledges

Key (continued)

Horizontal		Vertical	
30. Investment	39. Petroleum	29. Homestead	36. Marble
32. Live Stock	40. Cod	31. Yukon	38. Fox
33. Washington	41. exports	33. Whale	40. Copper
34. Whitehorse	42. Juneau	35. Seward	43. Hay
37. Mosquito	44. Nenana		

EDITORIAL NOTES AND NEWS

The map of Europe has undergone profound changes during the past year. This is particularly true because of the cession by Czechoslovakia of portions of its territories inhabited largely by Germans, Hungarians and Poles. During the same time there has



been a marked change in the political aspect of Europe. Czechoslovakia was the last state in central and eastern Europe to have a parliamentary democracy. It has now been transformed into a semi-authoritarian type of government. In Rumania the parliamentary system was also abolished during the year. In western Europe the "Popular Front" government in France was changed to a bourgeois type. It seems probable that by the time this note is published the authoritarian type of government by General Franco will have been extended thruout Spain.

The Soil Conservation Service recently announced several new land-use projects which are included in a nation wide program to buy over a period of several years submarginal lands, and put them to wiser usage. The Fort Rock Land Utilization Project plans to end futile attempts at dry land farming in an area unsuited to cash crop production. Instead, it aims to protect depleted range from overgrazing and restore grass coverage to denuded and eroding tracts. About twenty-five years ago this area had a population of about 900 families. Now scarcely fifty families occupy the land. The Lakeland Flatwoods Project in Georgia will retire from cultivation certain acres that have yielded an inadequate living from cotton and tobacco and restore them to forests and pastures. Cutover land will be returned to forest, and a lake area will be developed for wildlife and recreational purposes.

The Missouri State Council of Geography Teachers held its fall meeting in Kansas City in connection with the State Teachers Association. Dr. Sidney E. Ekblaw of Kansas City University presided. More than two hundred were present to hear Dr. Clarence F. Jones of Clark University speak on The Iron and Steel Industry—Its Geographic Factors. Dr. Carol Y. Mason of State Teachers College, Maryville, Missouri, addressed the group on Geography in Integrated Units for the Grades.

Dr. Sam T. Bratton of the University of Missouri reported on Proposed Changes in Missouri High School Geography, and conducted an open forum.

The faculty of the J. C. Murphy Junior High School, Atlanta, Georgia, publishes monthly a number of annotations of current magazine articles found in their library. The object is to familiarize teachers with professional writings that will enrich their background and help solve their problems. One of the annotations in the November, 1938, issue covers Harold Gluck's "Living With Geography," in *Social Studies*, Vol. 29, No. 7, November, 1938.

An index of geographical material of exceptional value is being put out each month (except July and August) by the American Geographical Society of New York. This material is carefully selected from the more than 800 technical and scientific publications received by the Society, much of which is not listed in the usual library catalog. Titles of accessions of books, government publications and outstanding maps and atlases are also regularly added to the index. This continuous, up-to-date record of current material is of value not only to geographers but to geologists, economists, and those in allied fields.

A large attendance is expected at the Eighth Biennial Congress of the World Federation of Education Associations at Rio, August 6-11. The specially chartered ship, the *Rotterdam,* sails from New York on July 5 and returns on August 27. Inquiries should be addressed to the World Federation of Education Associations, 1201-16th Street, N.W., Washington, D.C.

"Stories of New Jersey" is the title of a single volume compilation of the Federal Writers' Project of the W.P.A. It is intended for parallel reading in the elementary and secondary schools and covers a wide variety of subjects dealing with the development of the state. Appearing first in pamphlets, it was published in book form by M. Barrows and Co., under the sponsorship of the New Jersey Association of Teachers of Social Studies and the New Jersey Guild Associates, Inc. There is speculation that a similar undertaking may be launched in other states.

The radio news coverage of the European crisis of last September sponsored by the Columbia Broadcasting Company has been recorded verbatim and chronologically arranged in a volume entitled, "Crisis."

GEOGRAPHICAL PUBLICATIONS

Victor E. Shelford. **Animal Communities in Temperate America, As Illustrated in the Chicago Area.** The Geographic Society of Chicago. Bulletin No. 5. 368 pp. Illustrated. The University of Chicago Press, Chicago, Ill. Second Edition, 1937. $3.00

This study in animal ecology has been organized principally around the presentation of the physiology of organisms as opposed to the physiology of organs; the phenomena of behavior and physiology, especially as related to natural environments; and the organized comparable data of plant ecology. A number of distinguished scientists have assisted in the preparation and revision of the material. An extensive bibliography is included. C.P.S.

Edna Fay Campbell, Victor L. Webb, and William L. Nida, **The Old World, Past and Present.** Scott, Foresman and Co., N.Y. 1937. 582 pp.

The authors state as their objective the combination of history and geography, not into a wholly new subject in which the two disciplines are lost, but into a body of content in which the two are interwoven. They include material from the history and geography of Europe, Asia, Africa and Australia in a volume of more than five hundred pages.

In this difficult task the authors have been more successful in the treatment of certain regions than of others. At times they succeed in showing clearly the relationships of history and geography, but in other cases they do not give enough geography to set the stage for the events of history. The book offers evidence of the problems of organizing the two fields into one outline, especially that of where to interrupt the thread of history to include the geographic adjustments of the present. The treatment of the Iberian Peninsula gives an example. A brief paragraph about the geography introduces a chapter which tells the history of the region up to the time of Ferdinand and Isabella. The next chapter describes the geography of the Mediterranean countries of today. The later history of Spain is mentioned briefly with that of other countries.

Clear type, well-arranged pages, numerous illustrations make the book attractive to children. The vocabulary and the sentence structure are better adapted to the elementary grade level than those of many geography texts.

KATHERYNE THOMAS WHITTEMORE

State Teachers College
Buffalo, New York

Harry Eugene Flynn and Chester Benford Lund. **Tick Tock, A Story of Time.** 234 pp. Illustrated. D. C. Heath and Co., Boston. 1938.

The story in this elementary reading text or reader is developed thru the conversation of children in a home equipped with a variety of clocks. Thus interest in time at home leads to consideration of such timing devices as the burning rope, the hour glass, water clocks, time candles and lamps. As problem questions arise, the children are taken to see other time pieces where their mechanism and functioning are explained.